



# Nozzle Selection Guide

## for Multi-Pro Sprayers and Workman Vehicles

Model No. All Models

### Selection Guide

## Using the Nozzle Selection Tables

**Note:** The Unit Definitions and Conversions table is located on

**Note:** Toro recommends a vehicle speed of 3 to 5 MPH (5 to 9 km/h) and a nozzle pressure of 30-50 psi (2.0-3.5 Bar) while spraying.

The nozzle selection tables show application rates using specific nozzles while the vehicle travels at a various speeds.

The tables show nozzle application rates in US Gallons per Acre, US Gallons per 1,000 ft<sup>2</sup> and Liters per Hectare. Each table is organized by nozzle and each nozzle has a range of pressures and vehicle speeds listed.

See the nozzle selection tables in the following section to ensure that your spray nozzles have the capacity necessary to achieve the desired application rate.

- The table can be used to select the correct nozzle.  
Find the desired application rate within the appropriate table at the preferred vehicle speed and pressure, then select the nozzle that is listed in the left columns.

### Example:

The desired application rate is 24 GPA for the material to be sprayed. The preferred vehicle speed is 5 MPH. The desired pressure range is 30-50 psi.

Find the desired speed column at the top of the table. Follow that column down until you see your desired rate within the 30-50 psi pressure range.

As listed in the table, the nozzle with Toro part number 95-9222 has an application rate of 23.8 GPA when the vehicle speed is 5 MPH and pressure would be 40 psi.

- The table can be used to verify that a spray nozzle has the capacity necessary to achieve the application rate selected.

Find the nozzle in the left columns of the appropriate table, then look for application rate within that section by varying vehicle speed and/or pressure.

### Example:

The yellow nozzle with Toro part number 95-9221 is the only nozzle available and the material to be sprayed has an application rate of 20 GPA.

If vehicle speed is slowed to 3.5 MPH and pressure is raised to 60 psi one can achieve an application rate of 20.4 GPA with the yellow nozzle.

## Selecting a Nozzle

### GPA or US Gallons per 1000 ft<sup>2</sup>

- Determine the desired application rate from the manufacturer's labeling.  
\_\_\_\_\_ Gallons per acre or per 1000 ft<sup>2</sup>
- Determine the vehicle speed to apply the material.  
\_\_\_\_\_ MPH
- Verify that the nozzle spacing is 20 inches.
- Determine the Gallons per Minute using either the appropriate Nozzle Selection Table or GPM formula located at the end of this guide.

- \_\_\_\_\_ GPM
- Select nozzle size based on GPM.
- Once the nozzle is installed, spray water for initial test/calibration. Please refer to the Calibrating the Spray Pro™ Monitor section in the Operator's Manual. Use the Application Rate Switch to increase or decrease the application rate.

## Liters per Hectare

1. Determine the desired application rate from the manufacturer's labeling.  
\_\_\_\_\_ Liters per Hectare
2. Determine the vehicle speed to apply the material.  
\_\_\_\_\_ KmPH
3. Verify that the nozzle spacing is 50 centimeters.
4. Determine the Liters per Hectare using either the appropriate Nozzle Selection Tables or Liters per Hectare formulas located at the end of this guide.  
\_\_\_\_\_ Liters per Hectare
5. Select nozzle size based on Liters per Hectare.
6. Once the nozzle is installed, spray water for initial test/calibration. Please refer to the Calibrating the Spray Pro Monitor section in the Operator's Manual. Use the Application Rate Switch to increase or decrease the application rate.

PROTOTYPE

# Nozzle Selection Tables

**Important:** All application rates have been calculated using a nozzle spacing set up by the manufacturer (20 inches or 50 cm). If the nozzle spacing is changed, these application rates will no longer apply.

## Standard Booms

### US Gallons per Acre Application Rates - Standard Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)	Capacity 1 Nozzle (GPM)	US Gallons per Acre at 20 Inch Spacings							
				First Gear		Second Gear			Third Gear		
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
95-9221	1/4TTJ02 - VS Yellow	25	0.16	19.0	15.8	13.6	11.9	10.6	9.5	8.6	7.9
		30	0.17	20.2	16.8	14.4	12.6	11.2	10.1	9.2	8.4
		40	0.20	23.8	19.8	17.0	14.9	13.2	11.9	10.8	9.9
		50	0.22	26.1	21.8	18.7	16.3	14.5	13.1	11.9	10.9
		60	0.24	28.5	23.8	20.4	17.8	15.8	14.3	13.0	11.9
		75	0.27	32.1	26.7	22.9	20.0	17.8	16.0	14.6	13.4
95-9222	1/4TTJ04 - VS Red	25	0.32	38.0	31.7	27.2	23.8	21.1	19.0	17.3	15.8
		30	0.35	41.6	34.7	29.7	26.0	23.1	20.8	18.9	17.3
		40	0.40	47.5	39.6	33.9	29.7	26.4	23.8	21.6	19.8
		50	0.45	53.5	44.6	38.2	33.4	29.7	26.7	24.3	22.3
		60	0.49	58.2	48.5	41.6	36.4	32.3	29.1	26.5	24.3
		75	0.55	65.3	54.5	46.7	40.8	36.3	32.7	29.7	27.2
95-9223	1/4TTJ05 - VS Brown	25	0.40	47.5	39.6	33.9	29.7	26.4	23.8	21.6	19.8
		30	0.43	51.1	42.6	36.5	31.9	28.4	25.5	23.2	21.3
		40	0.50	59.4	49.5	42.4	37.1	33.0	29.7	27.0	24.8
		50	0.56	66.5	55.4	47.5	41.6	37.0	33.3	30.2	27.7
		60	0.61	72.5	60.4	51.8	45.3	40.3	36.2	32.9	30.2
		75	0.68	80.8	67.3	57.7	50.5	44.9	40.4	36.7	33.7
95-9224	1/4TTJ06 - VS Gray	25	0.47	55.8	46.5	39.9	34.9	31.0	27.9	25.4	23.3
		30	0.52	61.8	51.5	44.1	38.6	34.3	30.9	28.1	25.7
		40	0.60	71.3	59.4	50.9	44.6	39.6	35.6	32.4	29.7
		50	0.67	79.6	66.3	56.9	49.7	44.2	39.8	36.2	33.2
		60	0.73	86.7	72.3	61.9	54.2	48.2	43.4	39.4	36.1
		75	0.82	97.4	81.2	69.6	60.9	54.1	48.7	44.3	40.6
95-9225	1/4TTJ08 - VS White	25	0.63	74.8	62.4	53.5	46.8	41.6	37.4	34.0	31.2
		30	0.69	82.0	68.3	58.6	51.2	45.5	41.0	37.3	34.2
		40	0.80	95.0	79.2	67.9	59.4	52.8	47.5	43.2	39.6
		50	0.89	105.7	88.1	75.5	66.1	58.7	52.9	48.1	44.1
		60	0.98	116.4	97.0	83.2	72.8	64.7	58.2	52.9	48.5
		75	1.10	130.7	108.9	93.3	81.7	72.6	65.3	59.4	54.5

95-9188	1/4TTJ10 - VS Light Blue	25	0.79	93.9	78.2	67.0	58.7	52.1	46.9	42.7	39.1
		30	0.87	103.4	86.1	73.8	64.6	57.4	51.7	47.0	43.1
		40	1.00	118.8	99.0	84.9	74.3	66.0	59.4	54.0	49.5
		50	1.12	133.1	110.9	95.0	83.2	73.9	66.5	60.5	55.4
		60	1.22	144.9	120.8	103.5	90.6	80.5	72.5	65.9	60.4
		75	1.37	162.8	135.6	116.3	101.7	90.4	81.4	74.0	67.8
95-9226	1/4TTJ15 - VS Light Green	25	1.19	141.4	117.8	101.0	88.4	78.5	70.7	64.3	58.9
		30	1.30	154.4	128.7	110.3	96.5	85.8	77.2	70.2	64.4
		40	1.50	178.2	148.5	127.3	111.4	99.0	89.1	81.0	74.3
		50	1.68	199.6	166.3	142.6	124.7	110.9	99.8	90.7	83.2
		60	1.84	218.6	182.2	156.1	136.6	121.4	109.3	99.4	91.1
		75	2.05	243.5	203.0	174.0	152.2	135.3	121.8	110.7	101.5

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

PROTOTYPE

## US Gallons per 1000 ft<sup>2</sup> Application Rates - Standard Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)	Capacity 1 Nozzle (GPM)	US Gallons per 1000 ft <sup>2</sup> at 20 Inch Spacings							
				First Gear		Second Gear				Third Gear	
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
95 9221	1/4TTJ02 - VS Yellow	25	0.16	0.44	0.36	0.31	0.27	0.24	0.22	0.20	0.18
		30	0.17	0.46	0.39	0.33	0.29	0.26	0.23	0.21	0.19
		40	0.20	0.54	0.45	0.39	0.34	0.30	0.27	0.25	0.23
		50	0.22	0.60	0.50	0.43	0.37	0.33	0.30	0.27	0.25
		60	0.24	0.65	0.54	0.47	0.41	0.36	0.33	0.30	0.27
		75	0.27	0.73	0.61	0.52	0.46	0.41	0.37	0.33	0.31
95 9222	1/4TTJ04 - VS Red	25	0.32	0.87	0.73	0.62	0.54	0.48	0.44	0.40	0.36
		30	0.35	0.95	0.79	0.68	0.60	0.53	0.48	0.43	0.40
		40	0.40	1.09	0.91	0.78	0.68	0.60	0.54	0.49	0.45
		50	0.45	1.22	1.02	0.87	0.77	0.68	0.61	0.56	0.51
		60	0.49	1.33	1.11	0.95	0.83	0.74	0.67	0.61	0.56
		75	0.55	1.50	1.25	1.07	0.94	0.83	0.75	0.68	0.62
95 9223	1/4TTJ05 - VS Brown	25	0.40	1.09	0.91	0.78	0.68	0.60	0.54	0.49	0.45
		30	0.43	1.17	0.97	0.84	0.73	0.65	0.58	0.53	0.49
		40	0.50	1.36	1.13	0.97	0.85	0.76	0.68	0.62	0.57
		50	0.56	1.52	1.27	1.09	0.95	0.85	0.76	0.69	0.63
		60	0.61	1.66	1.38	1.19	1.04	0.92	0.83	0.75	0.69
		75	0.68	1.85	1.54	1.32	1.16	1.03	0.92	0.84	0.77
95 9224	1/4TTJ06 - VS Gray	25	0.47	1.28	1.07	0.91	0.80	0.71	0.64	0.58	0.53
		30	0.52	1.41	1.18	1.01	0.88	0.79	0.71	0.64	0.59
		40	0.60	1.63	1.36	1.17	1.02	0.91	0.82	0.74	0.68
		50	0.67	1.82	1.52	1.30	1.14	1.01	0.91	0.83	0.76
		60	0.73	1.99	1.65	1.42	1.24	1.10	0.99	0.90	0.83
		75	0.82	2.23	1.86	1.59	1.39	1.24	1.12	1.01	0.93
95 9225	1/4TTJ08 - VS White	25	0.63	1.71	1.43	1.22	1.07	0.95	0.86	0.78	0.71
		30	0.69	1.88	1.56	1.34	1.17	1.04	0.94	0.85	0.78
		40	0.80	2.18	1.81	1.55	1.36	1.21	1.09	0.99	0.91
		50	0.89	2.42	2.02	1.73	1.51	1.34	1.21	1.10	1.01
		60	0.98	2.67	2.22	1.90	1.67	1.48	1.33	1.21	1.11
		75	1.10	2.99	2.49	2.14	1.87	1.66	1.50	1.36	1.25
95 9188	1/4TTJ10 - VS Light Blue	25	0.79	2.15	1.79	1.53	1.34	1.19	1.07	0.98	0.90
		30	0.87	2.37	1.97	1.69	1.48	1.31	1.18	1.08	0.99
		40	1.00	2.72	2.27	1.94	1.70	1.51	1.36	1.24	1.13
		50	1.12	3.05	2.54	2.18	1.90	1.69	1.52	1.38	1.27
		60	1.22	3.32	2.77	2.37	2.07	1.84	1.66	1.51	1.38
		75	1.37	3.73	3.11	2.66	2.33	2.07	1.86	1.69	1.55

95 9226	1/4TTJ15 - VS Light Green	25	1.19	3.24	2.70	2.31	2.02	1.80	1.62	1.47	1.35
		30	1.30	3.54	2.95	2.53	2.21	1.96	1.77	1.61	1.47
		40	1.50	4.08	3.40	2.91	2.55	2.27	2.04	1.85	1.70
		50	1.68	4.57	3.81	3.26	2.86	2.54	2.28	2.08	1.90
		60	1.84	5.00	4.17	3.57	3.13	2.78	2.50	2.27	2.09
		75	2.05	5.58	4.65	3.98	3.49	3.10	2.79	2.53	2.32

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

PROTOTYPE

## Liters per Hectare Application Rates - Standard Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (Bar)	Capacity 1 Nozzle (LPM)	Liters per Hectare at 50 Centimeter Spacings							
				First Gear		Second Gear				Third Gear	
				4.0 KmPH	4.8 KmPH	5.6 KmPH	6.4 KmPH	7.2 KmPH	8.0 KmPH	8.8 KmPH	9.7 KmPH
95 9221	1/4TTJ02 - VS Yellow	1.72	0.61	183	153	131	114	102	92	83	75
		2.06	0.64	192	160	137	120	107	96	87	79
		2.76	0.76	228	190	163	143	127	114	104	94
		3.45	0.83	249	208	178	156	138	125	113	103
		4.13	0.91	273	228	195	171	152	137	124	113
		5.17	1.02	306	255	219	191	170	153	139	126
95 9222	1/4TTJ04 - VS Red	1.72	1.21	363	303	259	227	202	182	165	150
		2.06	1.32	396	330	283	248	220	198	180	163
		2.76	1.51	453	378	324	283	252	227	206	187
		3.45	1.70	510	425	364	319	283	255	232	210
		4.13	1.85	555	463	396	347	308	278	252	229
		5.17	2.08	624	520	446	390	347	312	284	257
95 9223	1/4TTJ05 - VS Brown	1.72	1.51	453	378	324	283	252	227	206	187
		2.06	1.63	489	408	349	306	272	245	222	202
		2.76	1.89	567	473	405	354	315	284	258	234
		3.45	2.12	636	530	454	398	353	318	289	262
		4.13	2.31	693	578	495	433	385	347	315	286
		5.17	2.57	771	643	551	482	428	386	350	318
95 9224	1/4TTJ06 - VS Gray	1.72	1.78	534	445	381	334	297	267	243	220
		2.06	1.97	591	493	422	369	328	296	269	244
		2.76	2.27	681	568	486	426	378	341	310	281
		3.45	2.54	762	635	544	476	423	381	346	314
		4.13	2.76	828	690	591	518	460	414	376	341
		5.17	3.10	930	775	664	581	517	465	423	384
95 9225	1/4TTJ08 - VS White	1.72	2.38	714	595	510	446	397	357	325	294
		2.06	2.61	783	653	559	489	435	392	356	323
		2.76	3.03	909	758	649	568	505	455	413	375
		3.45	3.34	1001	834	715	626	556	501	455	413
		4.13	3.71	1113	928	795	696	618	557	506	459
		5.17	4.16	1248	1040	891	780	693	624	567	515
95 9188	1/4TTJ10 - VS Light Blue	1.72	2.99	897	748	641	561	498	449	408	370
		2.06	3.29	987	823	705	617	548	494	449	407
		2.76	3.79	1137	948	812	711	632	569	517	469
		3.45	4.24	1272	1060	909	795	707	636	578	525
		4.13	4.62	1386	1155	990	866	770	693	630	572
		5.17	5.19	1557	1298	1112	973	865	779	708	642

95 9226	1/4TTJ15 - VS Light Green	1.72	4.50	1350	1125	964	844	750	675	614	557
		2.06	4.92	1476	1230	1054	923	820	738	671	609
		2.76	5.68	1704	1420	1217	1065	947	852	775	703
		3.45	6.36	1908	1590	1363	1193	1060	954	867	787
		4.13	6.96	2088	1740	1491	1305	1160	1044	949	861
		5.17	7.76	2328	1940	1663	1455	1293	1164	1058	960

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

PROTOTYPE

# Covered Booms

## US Gallons per Acre Application Rates - Covered Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)	Capacity 1 Nozzle (GPM)	US Gallons per Acre at 20 Inch Spacings							
				First Gear		Second Gear				Third Gear	
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
117-5834	XRC 11004 - VS 110° Red	20	0.28	33.3	27.7	23.8	20.8	18.5	16.6	15.1	13.9
		30	0.35	41.6	34.7	29.7	26.0	23.1	20.8	18.9	17.3
		40	0.40	47.5	39.6	33.9	29.7	26.4	23.8	21.6	19.8
		50	0.45	53.5	44.6	38.2	33.4	29.7	26.7	24.3	22.3
		60	0.49	58.2	48.5	41.6	36.4	32.3	29.1	26.5	24.3
117-5835	XRC 11005 - VS 110° Brown	20	0.35	41.6	34.7	29.7	26.0	23.1	20.8	18.9	17.3
		30	0.43	51.1	42.6	36.5	31.9	28.4	25.5	23.2	21.3
		40	0.50	59.4	49.5	42.4	37.1	33.0	29.7	27.0	24.8
		50	0.56	66.5	55.4	47.5	41.6	37.0	33.3	30.2	27.7
		60	0.61	72.5	60.4	51.8	45.3	40.3	36.2	32.9	30.2
117-5836	XRC 11006 - VP 110° Gray	20	0.42	49.9	41.6	35.6	31.2	27.7	24.9	22.7	20.8
		30	0.52	61.8	51.5	44.1	38.6	34.3	30.9	28.1	25.7
		40	0.60	71.3	59.4	50.9	44.6	39.6	35.6	32.4	29.7
		50	0.67	79.6	66.3	56.9	49.7	44.2	39.8	36.2	33.2
		60	0.73	86.7	72.3	61.9	54.2	48.2	43.4	39.4	36.1
117-5837	XRC 11008 - VP 110° White	20	0.57	67.7	56.4	48.4	42.3	37.6	33.9	30.8	28.2
		30	0.69	82.0	68.3	58.6	51.2	45.5	41.0	37.3	34.2
		40	0.80	95.0	79.2	67.9	59.4	52.8	47.5	43.2	39.6
		50	0.89	105.7	88.1	75.5	66.1	58.7	52.9	48.1	44.1
		60	0.98	116.4	97.0	83.2	72.8	64.7	58.2	52.9	48.5
117-5838	XRC 11010 - VP 110° Lt. Blue	20	0.71	84.3	70.3	60.2	52.7	46.9	42.2	38.3	35.1
		30	0.87	103.4	86.1	73.8	64.6	57.4	51.7	47.0	43.1
		40	1.00	118.8	99.0	84.9	74.3	66.0	59.4	54.0	49.5
		50	1.12	133.1	110.9	95.0	83.2	73.9	66.5	60.5	55.4
		60	1.22	144.9	120.8	103.5	90.6	80.5	72.5	65.9	60.4
117-5839	XRC 11015 - VP 110° Lt. Green	20	1.06	125.9	104.9	89.9	78.7	70.0	63.0	57.2	52.5
		30	1.30	154.4	128.7	110.3	96.5	85.8	77.2	70.2	64.4
		40	1.50	178.2	148.5	127.3	111.4	99.0	89.1	81.0	74.3
		50	1.68	199.6	166.3	142.6	124.7	110.9	99.8	90.7	83.2
		60	1.84	218.6	182.2	156.1	136.6	121.4	109.3	99.4	91.1

**Note:** Lower pressures produce larger droplets and help reduce mist under the covered boom.

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

## US Gallons per 1000 ft<sup>2</sup> Application Rates - Covered Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)	Capacity 1 Nozzle (GPM)	US Gallons per 1000 ft <sup>2</sup> at 20 Inch Spacings							
				<i>First Gear</i>		<i>Second Gear</i>				<i>Third Gear</i>	
				2.5 MPH	3 MPH	3.5 MPH	4 MPH	4.5 MPH	5 MPH	5.5 MPH	6 MPH
117-5834	XRC 11004 - VS 110° Red	20	0.28	0.76	0.63	0.54	0.48	0.42	0.38	0.35	0.32
		30	0.35	0.95	0.79	0.68	0.60	0.53	0.48	0.43	0.40
		40	0.40	1.09	0.91	0.78	0.68	0.60	0.54	0.49	0.45
		50	0.45	1.22	1.02	0.87	0.77	0.68	0.61	0.56	0.51
		60	0.49	1.33	1.11	0.95	0.83	0.74	0.67	0.61	0.56
117-5835	XRC 11005 - VS 110° Brown	20	0.35	0.95	0.79	0.68	0.60	0.53	0.48	0.43	0.40
		30	0.43	1.17	0.97	0.84	0.73	0.65	0.58	0.53	0.49
		40	0.50	1.36	1.13	0.97	0.85	0.76	0.68	0.62	0.57
		50	0.56	1.52	1.27	1.09	0.95	0.85	0.76	0.69	0.63
		60	0.61	1.66	1.38	1.19	1.04	0.92	0.83	0.75	0.69
117-5836	XRC 11006 - VP 110° Gray	20	0.42	1.14	0.95	0.82	0.71	0.63	0.57	0.52	0.48
		30	0.52	1.41	1.18	1.01	0.88	0.79	0.71	0.64	0.59
		40	0.60	1.63	1.36	1.17	1.02	0.91	0.82	0.74	0.68
		50	0.67	1.82	1.52	1.30	1.14	1.01	0.91	0.83	0.76
		60	0.73	1.99	1.65	1.42	1.24	1.10	0.99	0.90	0.83
117-5837	XRC 11008 - VP 110° White	20	0.57	1.55	1.29	1.11	0.97	0.86	0.78	0.70	0.65
		30	0.69	1.88	1.56	1.34	1.17	1.04	0.94	0.85	0.78
		40	0.80	2.18	1.81	1.55	1.36	1.21	1.09	0.99	0.91
		50	0.89	2.42	2.02	1.73	1.51	1.34	1.21	1.10	1.01
		60	0.98	2.67	2.22	1.90	1.67	1.48	1.33	1.21	1.11
117-5838	XRC 11010 - VP 110° Lt. Blue	20	0.71	1.93	1.61	1.38	1.21	1.07	0.97	0.88	0.80
		30	0.87	2.37	1.97	1.69	1.48	1.31	1.18	1.08	0.99
		40	1.00	2.72	2.27	1.94	1.70	1.51	1.36	1.24	1.13
		50	1.12	3.05	2.54	2.18	1.90	1.69	1.52	1.38	1.27
		60	1.22	3.32	2.77	2.37	2.07	1.84	1.66	1.51	1.38
117-5839	XRC 11015 - VP 110° Lt. Green	20	1.06	2.88	2.40	2.06	1.80	1.60	1.44	1.31	1.20
		30	1.30	3.54	2.95	2.53	2.21	1.96	1.77	1.61	1.47
		40	1.50	4.08	3.40	2.91	2.55	2.27	2.04	1.85	1.70
		50	1.68	4.57	3.81	3.26	2.86	2.54	2.28	2.08	1.90
		60	1.84	5.00	4.17	3.57	3.13	2.78	2.50	2.27	2.09

**Note:** Lower pressures produce larger droplets and help reduce mist under the covered boom.

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

## Liters per Hectare Application Rates - Covered Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (Bar)	Capacity 1 Nozzle (LPM)	Liters per Hectare at 50 Centimeter Spacings							
				First Gear		Second Gear				Third Gear	
				4.0 KmPH	4.8 KmPH	5.6 KmPH	6.4 KmPH	7.2 KmPH	8.0 KmPH	8.8 KmPH	9.7 KmPH
117-5834	XRC 11004 - VS 110° Red	1.38	1.06	318	265	227	199	177	159	145	131
		2.07	1.32	396	330	283	248	220	198	180	163
		2.76	1.51	453	378	324	283	252	227	206	187
		3.45	1.70	510	425	364	319	283	255	232	210
		4.14	1.85	555	463	396	347	308	278	252	229
117-5835	XRC 11005 - VS 110° Brown	1.38	1.32	396	330	283	248	220	198	180	163
		2.07	1.63	489	408	349	306	272	245	222	202
		2.76	1.89	567	473	405	354	315	284	258	234
		3.45	2.12	636	530	454	398	353	318	289	262
		4.14	2.31	693	578	495	433	385	347	315	286
117-5836	XRC 11006 - VP 110° Gray	1.38	1.59	477	398	341	298	265	239	217	197
		2.07	1.97	591	493	422	369	328	296	269	244
		2.76	2.27	681	568	486	426	378	341	310	281
		3.45	2.54	762	635	544	476	423	381	346	314
		4.14	2.76	828	690	591	518	460	414	376	341
117-5837	XRC 11008 - VP 110° White	1.38	2.16	648	540	463	405	360	324	295	267
		2.07	2.61	783	653	559	489	435	392	356	323
		2.76	3.03	909	758	649	568	505	455	413	375
		3.45	3.37	1011	843	722	632	562	506	460	417
		4.14	3.71	1113	928	795	696	618	557	506	459
117-5838	XRC 11010 - VP 110° Lt. Blue	1.38	2.69	807	673	576	504	448	404	367	333
		2.07	3.29	987	823	705	617	548	494	449	407
		2.76	3.79	1137	948	812	711	632	569	517	469
		3.45	4.24	1272	1060	909	795	707	636	578	525
		4.14	4.62	1386	1155	990	866	770	693	630	572
117-5839	XRC 11015 - VP 110° Lt. Green	1.38	4.01	1203	1003	859	752	668	602	547	496
		2.07	4.92	1476	1230	1054	923	820	738	671	609
		2.76	5.68	1704	1420	1217	1065	947	852	775	703
		3.45	6.36	1908	1590	1363	1193	1060	954	867	787
		4.14	6.96	2088	1740	1491	1305	1160	1044	949	861

**Note:** Lower pressures produce larger droplets and help reduce mist under the covered boom.

*Italicized gear ranges are applicable to Multi-Pro 1200 and 1250 Sprayers only.  
Speeds cited above can be achieved in low range on Workman 200 Spray Systems.*

# Covered Walking Booms

## US Gallons per Acre Application Rates - Covered Walking Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)*	Capacity 1 Nozzle (GPM)	US Gallons per Acre at 20 Inch Spacings					
				Walking Speed					
				1.0 MPH	1.5 MPH	2.0 MPH	2.5 MPH	3.0 MPH	3.5 MPH
117-5834	XRC 11004 - VS 110° Red	15	0.32	95.0	63.4	47.5	38.0	31.7	27.2
		20	0.35	104.0	69.3	52.0	41.6	34.7	29.7
		25	0.40	118.8	79.2	59.4	47.5	39.6	33.9
		30	0.45	133.7	89.1	66.8	53.5	44.6	38.2
		35	0.49	145.5	97.0	72.8	58.2	48.5	41.6
		40	0.55	163.4	108.9	81.7	65.3	54.5	46.7
117-5835	XRC 11005 - VS 110° Brown	15	0.40	118.8	79.2	59.4	47.5	39.6	33.9
		20	0.43	127.7	85.1	63.9	51.1	42.6	36.5
		25	0.50	148.5	99.0	74.3	59.4	49.5	42.4
		30	0.56	166.3	110.9	83.2	66.5	55.4	47.5
		35	0.61	181.2	120.8	90.6	72.5	60.4	51.8
		40	0.68	202.0	134.6	101.0	80.8	67.3	57.7
117-5836	XRC 11006 - VP 110° Gray	15	0.47	139.6	93.1	69.8	55.8	46.5	39.9
		20	0.52	154.4	103.0	77.2	61.8	51.5	44.1
		25	0.60	178.2	118.8	89.1	71.3	59.4	50.9
		30	0.67	199.0	132.7	99.5	79.6	66.3	56.9
		35	0.73	216.8	144.5	108.4	86.7	72.3	61.9
		40	0.82	243.5	162.4	121.8	97.4	81.2	69.6
117-5837	XRC 11008 - VP 110° White	15	0.63	187.1	124.7	93.6	74.8	62.4	53.5
		20	0.69	204.9	136.6	102.5	82.0	68.3	58.6
		25	0.80	237.6	158.4	118.8	95.0	79.2	67.9
		30	0.89	264.3	176.2	132.2	105.7	88.1	75.5
		35	0.98	291.1	194.0	145.5	116.4	97.0	83.2
		40	1.10	326.7	217.8	163.4	130.7	108.9	93.3
117-5838	XRC 11010 - VP 110° Lt. Blue	15	0.79	234.6	156.4	117.3	93.9	78.2	67.0
		20	0.87	258.4	172.3	129.2	103.4	86.1	73.8
		25	1.00	297.0	198.0	148.5	118.8	99.0	84.9
		30	1.12	332.6	221.8	166.3	133.1	110.9	95.0
		35	1.22	362.3	241.6	181.2	144.9	120.8	103.5
		40	1.37	406.9	271.3	203.4	162.8	135.6	116.3
117-5839	XRC 11015 - VP 110° Lt. Green	15	1.19	353.4	235.6	176.7	141.4	117.8	101.0
		20	1.30	386.1	257.4	193.1	154.4	128.7	110.3
		25	1.50	445.5	297.0	222.8	178.2	148.5	127.3
		30	1.68	499.0	332.6	249.5	199.6	166.3	142.6
		35	1.84	546.5	364.3	273.2	218.6	182.2	156.1

		40	2.05	608.9	405.9	304.4	243.5	203.0	174.0	
--	--	----	------	-------	-------	-------	-------	-------	-------	--

\*This is the pressure at the nozzle. System pressure may be set higher.

*PROTOTYPE*

## US Gallons per 1000 ft<sup>2</sup> Application Rates - Covered Walking Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (psi)*	Capacity 1 Nozzle (GPM)	US Gallons per 1000 ft <sup>2</sup> at 20 Inch Spacings					
				Walking Speed					
				1.0 MPH	1.5 MPH	2.0 MPH	2.5 MPH	3.0 MPH	3.5 MPH
117-5834	XRC 11004 - VS 110° Red	15	0.32	2.18	1.45	1.09	0.87	0.73	0.62
		20	0.35	2.38	1.59	1.19	0.95	0.79	0.68
		25	0.40	2.72	1.81	1.36	1.09	0.91	0.78
		30	0.45	3.06	2.04	1.53	1.22	1.02	0.87
		35	0.49	3.33	2.22	1.67	1.33	1.11	0.95
		40	0.55	3.74	2.49	1.87	1.50	1.25	1.07
117-5835	XRC 11005 - VS 110° Brown	15	0.40	2.72	1.81	1.36	1.09	0.91	0.78
		20	0.43	2.92	1.95	1.46	1.17	0.97	0.84
		25	0.50	3.40	2.27	1.70	1.36	1.13	0.97
		30	0.56	3.81	2.54	1.90	1.52	1.27	1.09
		35	0.61	4.15	2.77	2.07	1.66	1.38	1.19
		40	0.68	4.62	3.08	2.31	1.85	1.54	1.32
117-5836	XRC 11006 - VP 110° Gray	15	0.47	3.20	2.13	1.60	1.28	1.07	0.91
		20	0.52	3.54	2.36	1.77	1.41	1.18	1.01
		25	0.60	4.08	2.72	2.04	1.63	1.36	1.17
		30	0.67	4.56	3.04	2.28	1.82	1.52	1.30
		35	0.73	4.96	3.31	2.48	1.99	1.65	1.42
		40	0.82	5.58	3.72	2.79	2.23	1.86	1.59
117-5837	XRC 11008 - VP 110° White	15	0.63	4.28	2.86	2.14	1.71	1.43	1.22
		20	0.69	4.69	3.13	2.35	1.88	1.56	1.34
		25	0.80	5.44	3.63	2.72	2.18	1.81	1.55
		30	0.89	6.05	4.03	3.03	2.42	2.02	1.73
		35	0.98	6.66	4.44	3.33	2.67	2.22	1.90
		40	1.10	7.48	4.99	3.74	2.99	2.49	2.14
117-5838	XRC 11010 - VP 110° Lt. Blue	15	0.79	5.37	3.58	2.69	2.15	1.79	1.53
		20	0.87	5.92	3.94	2.96	2.37	1.97	1.69
		25	1.00	6.80	4.53	3.40	2.72	2.27	1.94
		30	1.12	7.62	5.08	3.81	3.05	2.54	2.18
		35	1.22	8.30	5.53	4.15	3.32	2.77	2.37
		40	1.37	9.32	6.21	4.66	3.73	3.11	2.66
117-5839	XRC 11015 - VP 110° Lt. Green	15	1.19	8.09	5.39	4.05	3.24	2.70	2.31
		20	1.30	8.84	5.89	4.42	3.54	2.95	2.53
		25	1.50	10.20	6.80	5.10	4.08	3.40	2.91
		30	1.68	11.42	7.62	5.71	4.57	3.81	3.26
		35	1.84	12.51	8.34	6.26	5.00	4.17	3.57
		40	2.05	13.94	9.29	6.97	5.58	4.65	3.98

\*This is the pressure at the nozzle. System pressure may be set higher.

## Liters per Hectare Application Rates - Covered Walking Booms

Toro Part Number	Nozzle Number - Color Code	Pressure (Bar)*	Capacity 1 Nozzle (LPM)	Liters per Hectare at 50 Centimeter Spacings					
				Walking Speed					
				1.6 KmPH	2.4 KmPH	3.2 KmPH	4.0 KmPH	4.8 KmPH	5.6 KmPH
117-5834	XRC 11004 - VS 110° Red	1.04	1.21	908	605	454	363	303	259
		1.38	1.32	990	660	495	396	330	283
		1.73	1.51	1133	755	566	453	378	324
		2.07	1.70	1275	850	638	510	425	364
		2.42	1.85	1388	925	694	555	463	396
		2.76	2.08	1560	1040	780	624	520	446
117-5835	XRC 11005 - VS 110° Brown	1.04	1.51	1133	755	566	453	378	324
		1.38	1.63	1223	815	611	489	408	349
		1.73	1.89	1418	945	709	567	473	405
		2.07	2.12	1590	1060	795	636	530	454
		2.42	2.31	1733	1155	866	693	578	495
		2.76	2.57	1928	1285	964	771	643	551
117-5836	XRC 11006 - VP 110° Gray	1.04	1.78	1335	890	668	534	445	381
		1.38	1.97	1478	985	739	591	493	422
		1.73	2.27	1703	1135	851	681	568	486
		2.07	2.54	1905	1270	953	762	635	544
		2.42	2.76	2070	1380	1035	828	690	591
		2.76	3.10	2325	1550	1163	930	775	664
117-5837	XRC 11008 - VP 110° White	1.04	2.38	1785	1190	893	714	595	510
		1.38	2.61	1958	1305	979	783	653	559
		1.73	3.03	2273	1515	1136	909	758	649
		2.07	3.37	2528	1685	1264	1011	843	722
		2.42	3.71	2783	1855	1391	1113	928	795
		2.76	4.16	3120	2080	1560	1248	1040	891
117-5838	XRC 11010 - VP 110° Lt. Blue	1.04	2.99	2243	1495	1121	897	748	641
		1.38	3.29	2468	1645	1234	987	823	705
		1.73	3.79	2843	1895	1421	1137	948	812
		2.07	4.24	3180	2120	1590	1272	1060	909
		2.42	4.62	3465	2310	1733	1386	1155	990
		2.76	5.19	3893	2595	1946	1557	1298	1112
117-5839	XRC 11015 - VP 110° Lt. Green	1.04	4.50	3375	2250	1688	1350	1125	964
		1.38	4.92	3690	2460	1845	1476	1230	1054
		1.73	5.68	4260	2840	2130	1704	1420	1217
		2.07	6.36	4770	3180	2385	1908	1590	1363
		2.42	6.96	5220	3480	2610	2088	1740	1491
		2.76	7.75	5813	3875	2906	2325	1938	1661

\*This is the pressure at the nozzle. System pressure may be set higher.

# Calculating Application Rates

Use the following formulas to verify application rates or to determine new application rates. The formulas are divided by application rate units.

$$\text{US Gallons per Acre} = \frac{(5,940 \times \text{GPM per Nozzle})}{(\text{MPH} \times 20^*)}$$

$$\text{US Gallons per 1000 ft}^2 = \frac{(136 \times \text{GPM per Nozzle})}{(\text{MPH} \times 20^*)}$$

\* Toro nozzle spacing is 20 inches

$$\text{Speed (MPH)} = \frac{(\text{Distance (ft)} \times 60)}{(\text{Time (seconds)} \times 88)}$$

---


$$\text{Liters per Hectare} = \frac{(60,000 \times \text{Liters per minute})}{(\text{KMPH} \times 50^*)}$$

\* Toro nozzle spacing is 50 centimeters

$$\text{Speed (KMPH)} = \frac{(\text{Distance (m)} \times 36)}{(\text{Time (seconds)})}$$

US Gallons X 0.83267 = Imperial Gallons
US Gallons X 8.34 = Pounds (Water)

<b>Acre Conversions</b>
1 Acre = 43,560 ft <sup>2</sup>
1 square meter = 10.764 ft <sup>2</sup>
1 hectare = 2.471 acres or 10,000 m <sup>2</sup>

<b>Length Conversions</b>
1 millimeter (mm) = 0.039 in
1 centimeter (cm) = 0.393 in
1 meter (m) = 3.281 in
1 kilometer (km) = 0.621 mile
1 inch = 25.4 millimeters; 2.54 centimeters
1 mile = 1.609 kilometers

<b>Pressure Conversions</b>
1 psi = 0.069 Bar
1 Bar = 14.5 psi

## Unit Definitions and Conversions

Units	Definition
GPM	US Gallons per minute
L/min	Liters per minute
dL/min	Deciliters per minute
psi	Pounds per square inch
Bar	Bar
GPA	US Gallons per acre
L/ha	Liters per hectare
mL/ha	Milliliters per hectare
Gallons/1000ft <sup>2</sup>	US Gallons per 1,000 ft <sup>2</sup>
mm	Millimeter
cm	Centimeter
MPH	Miles per hour
km	Kilometer
KmPH	Kilometers per hour

<b>Liquid Conversions</b>
US Gallons X 128 = Fluid Ounces
US Gallons X 3.785 = Liters

PROTOTYPE

# Calculating Nozzle Capacity

## Calculating in US Gallons per Acre or US Gallons per 1000 ft<sup>2</sup>

To calculate the nozzle capacity you need to know the following:

- The recommended application rate for material being used in US gallons per acre or per 1000 square feet.
- The preferred vehicle speed in miles per hour.
- The nozzle spacing along boom (20 inches).

With this information you can calculate the volume per minute (or flow rate) for each nozzle using the following formula.

### GPA Example:

$$\text{GPM per nozzle} = \frac{(\text{GPA} \times \text{MPH} \times 20^* \text{ Inches})}{5,940}$$

\* Toro nozzle spacing is 20 inches

### US Gallons per Acre Formula

Application Rate (AR)= 45 US Gallons per Acre  
 Vehicle Speed (VS)= 4 MPH Nozzle Spacing (NS)= 20 inches

$$\frac{(\text{AR} \times \text{VS} \times \text{NS})}{5,940} = \frac{(45 \times 4 \times 20)}{5,940} = 0.61 \text{ GPM per nozzle}$$

With 0.61 GPM and recommended pressure of 30-50 psi select the gray nozzle with Toro part number 95-9224.

### U.S. Gallons per 1000 ft<sup>2</sup> Example:

$$\text{GPM per nozzle} = \frac{(\text{Gallons per 1000 ft}^2 \times \text{MPH} \times 20^* \text{ Inches})}{136}$$

\* Toro nozzle spacing is 20 inches

### U.S. Gallons per 1000 ft<sup>2</sup> Formula

Application Rate (AR)= 1 U.S. Gallons per 1000 ft<sup>2</sup>  
 Vehicle Speed (VS)= 4 MPH Nozzle Spacing (NS)= 20 inches

$$\frac{(\text{AR} \times \text{VS} \times \text{NS})}{136} = \frac{(1 \times 4 \times 20)}{136} = 0.59 \text{ GPM per nozzle}$$

With 0.59 GPM and approximate pressure of 30-50 psi the nozzle with Toro part number 95-9224 would be selected.

## Calculating in Liters per Hectare

To calculate the nozzle capacity you need to know the following:

- The recommended application rate for material being used in liters per hectare.
- The preferred vehicle speed in kilometers per hour.
- The nozzle spacing along boom (50 centimeters).

With this information you can calculate the volume per minute (or flow rate) for each nozzle using the following formula.

### L/ha Example:

$$\text{Liters a Minute per nozzle} = \frac{(\text{Liters per ha} \times \text{KmPH} \times 50^* \text{ cm})}{60,000}$$

\* Toro nozzle spacing is 50 centimeters

### US Gallons per Acre Formula

Application Rate (AR)= 910 Liters per Hectare  
 Vehicle Speed (VS)= 5 KmPH Nozzle Spacing (NS)= 50 centimeters

$$\frac{(\text{AR} \times \text{VS} \times \text{NS})}{60,000} = \frac{(910 \times 5 \times 50)}{60,000} = 3.79 \text{ Liters a minute per nozzle}$$

Use L/minute and Pressure to select an appropriate nozzle from nozzle selection tables in the following section.

With 3.79 L/minute and recommended pressure of 2.7 Bar the nozzle with Toro part number 95-9188 would be selected.

**Notes:**

*PROTOTYPE*

**Notes:**

*PROTOTYPE*



**Count on it.**

*PROTOTYPE*